Comparing the Responsiveness of Streams and Ponds to Decreases in Acid Deposition

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Broad Study Questions

- Have recent decreases in acid deposition altered stream and pond water chemistry?
- Are there differences between the recovery rates of inlet/outlet streams and their corresponding ponds?
- What are the current water chemistry trends?
Correlating Stream pH and Bedrock Lithology
Focused Study Questions

- Is bedrock lithology correlated with stream pH?
- What effect could lithology have on in-stream water chemistry?
- Is lithology something that needs to be considered when understanding water chemistry?
Study Sites

- Vermont
  - Furance Brook
  - Walloomsac River
  - Centennial Brook
  - Munroe Brook (2 separate sites)

- New Hampshire (White Mountain National Forest)
  - Black Pond Inlet
  - Cone Pond Inlet
  - East Pond Inlet
  - Kiah Pond Inlet
  - Upper Hall Pond Inlet
Location of Study Sites in Vermont and New Hampshire
Methods

- Collected VT data via Vermont EPSCoR Streams website, publicly available GIS data.
- Collected NH data over summer 2009 through Hubbard Brook REU program, publicly available GIS data.
Area Lithology

Vermont
- Dolostone
- Marble

New Hampshire
- Granite
- Quartzite
Results!
Conclusions

- Stream pH is correlated to bedrock lithology
- Vermont sites (containing dolostone and marble) have higher pH values than New Hampshire sites (containing granite and quartzite.)
Why?

- Both dolostone and marble contain calcium carbonate, which can act as a buffering agent.
- $\text{CaCO}_3$ is dissolved by acid, and prevents pH from decreasing.
- Granite and quartzite do not contain $\text{CaCO}_3$. 
The Bigger Picture

- Should consider lithology when interpreting water quality data
- Since lithology is correlated with lower pH (higher acidity) acid deposition may have different effects in Vermont streams than in New Hampshire streams
- New Hampshire streams may be more sensitive than Vermont streams, because of lack of buffer
Thank you!

- Vermont EPSCoR Streams Project
  - High schools for collecting samples
  - Streams lab for analyzing samples
  - Lexie Haselton for GIS help

- Hubbard Brook REU Program
  - Funding, resources to gather New Hampshire data